

What we claim is:

1. A catheter comprising:  
an elongate shaft having a proximal region, a distal region, and an exterior surface extending therebetween; and  
removable support means for providing column support to the elongate shaft, the removable support means disposed over at least a portion of the exterior surface of the elongate shaft.
2. The catheter of claim 1, further comprising anchoring means for securing the removable support means, the anchoring means disposed on a portion of the exterior surface of the elongate shaft.
3. The catheter of claim 2, wherein the anchoring means have a cross-sectional profile configured to permit the removable support means to move axially with respect to the elongate shaft while limiting relative radial movement.
4. The catheter of claim 2, wherein the anchoring means comprises one or more support tracks axially disposed on the exterior surface of the elongate shaft.
5. The catheter of claim 4, wherein the removable support means comprises one or more support ribs configured to be disposed over the one or more support tracks.
6. The catheter of claim 5, wherein each of the one or more support ribs slide axially over each of the one or more support tracks.
7. The catheter of claim 4, wherein the one or more support tracks comprise four support tracks that are axially disposed such that each support is radially evenly spaced around the elongate shaft.

8. The catheter of claim 2, wherein the support means comprises a sheath configured to be removably disposed over the anchoring means.

9. A modular guide catheter, comprising:  
an elongate shaft having a proximal region, a distal region and a lumen extending therebetween, the elongate shaft having an external surface;  
a plurality of support tracks disposed on the external surface of the elongate shaft, the support tracks axially aligned with the elongate shaft; and  
a plurality of support ribs that are configured to be removably disposed over at least a portion of the plurality of support tracks.

10. The modular guide catheter of claim 9, wherein each of the support tracks have a cross-section profile configured to permit each of the support ribs to move axially with respect to each support track while limiting relative radial movement.

11. The modular guide catheter of claim 10, wherein the cross-section profile comprises an ovoid cross-section having a minor dimension perpendicular to the exterior surface of the elongate surface and a major dimension perpendicular to the minor dimension.

12. The modular guide catheter of claim 11, wherein the major dimension varies as a function of distance from the exterior surface of the elongate shaft.

13. The modular guide catheter of claim 11, wherein the major dimension is minimized at a position proximate the exterior surface of the elongate shaft and is maximized at a position radially displaced from the exterior surface a distance equal to or less than the minor dimension.

14. The modular guide catheter of claim 10, wherein each of the plurality of support ribs have a cross-section profile complementary to the cross-section profile of each of the plurality of support tracks.

15. The modular guide catheter of claim 9, wherein the plurality of support tracks comprise four support tracks axially aligned along the elongate shaft, each equidistantly spaced around a radius of the elongate shaft.

16. The modular guide catheter of claim 9, wherein the plurality of support tracks are heat bonded to the exterior surface of the elongate shaft.

17. The modular guide catheter of claim 9, wherein the plurality of support tracks are adhesively secured to the exterior surface of the elongate shaft.

18. The modular guide catheter of claim 9, wherein the plurality of support tracks are integrally extruded with the elongate shaft.

19. The modular guide catheter of claim 9, wherein each of the plurality of support ribs comprises a fluorinated polyethylene polymer.

20. The modular guide catheter of claim 19, wherein the fluorinated polyethylene polymer comprises polytetrafluoroethylene.

21. The modular guide catheter of claim 9, wherein the distal region of the elongate shaft includes a distal end, and the plurality of support tracks extend from a position proximate the proximal region of the elongate shaft to a position proximal of the distal end of the elongate shaft.

22. A method of deploying a catheter within a vascular lumen, the catheter comprising an elongate shaft having a proximal end, a distal end, an exterior surface

extending therebetween, and a plurality of support tracks axially disposed over the exterior surface, the method comprising steps of:

advancing the catheter through the vascular lumen until the distal end of the elongate shaft reaches a desired position within the vascular lumen; and

deploying one or more support ribs over one or more of the plurality of support tracks and advancing the one or more support ribs over one or more of the plurality of support tracks to a position proximal of the distal end of the elongate shaft.

23. The method of claim 22, further comprising a step of deploying a treatment device through the catheter after deploying and advancing the one or more support ribs, where the treatment device is advanced distally of the distal end of the catheter.

24. The method of claim 23, further comprising a step of withdrawing the treatment device from the catheter while the one or more support ribs remain in position.

25. The method of claim 24, further comprising a step of withdrawing the one or more support ribs after withdrawing the treatment device.